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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/564,573	01/13/2006	Dominic J. Heuscher	PHUS030239US	3323

38107 7590 04/13/2007

PHILIPS INTELLECTUAL PROPERTY & STANDARDS
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CLEVELAND, OH 44143

EXAMINER	
YUN, JURIE	
ART UNIT	PAPER NUMBER
2882	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/564,573	HEUSCHER, DOMINIC J.	
	Examiner	Art Unit	
	Jurie Yun	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,13-15,17-20 and 24* is/are rejected.

7)☒ Claim(s) *8-12,16 and 21-23* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 January 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/13/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The preliminary amendment filed 1/13/06 has been entered.

Claim Objections

2. Claim 19 is objected to because of the following informalities: there is lack of antecedence for "the at least one electron beam." It appears as though claim 19 should depend on claim 18, and has been treated as such. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 7, 17, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Shaw, IV (USPN 4,039,836) – hereinafter referenced "Shaw".

5. With respect to claims 1 and 17, Shaw discloses an x-ray tube (Fig. 9) that injects an x-ray conebeam into an examination region, the x-ray tube including: a rotating cylindrical anode (74) having a target outer surface region, the cylindrical anode rotating about a longitudinally aligned cylinder axis; an electron accelerating means (97) for accelerating electrons toward at least one selected spot on the target outer surface region of the cylindrical anode to generate x-rays; and a sweep means (99, 101, 102, 103) for relatively longitudinally sweeping the at least one selected spot across the target outer surface region of the cylindrical anode (column 8, lines 7-16).

6. With respect to claim 7, Shaw discloses the accelerated electrons define an electron beam, and the sweep means includes: an electron deflector that selectively deflects the electron beam to sweep the at least one selected spot across the target outer surface region of the cylindrical anode (column 5, lines 34-44).

7. With respect to claim 18, Shaw discloses the relative sweeping includes: steering at least one electron beam defined by the accelerated electrons longitudinally across the cylindrical anode (column 8, lines 7-16).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw, IV (USPN 4,039,836) as applied to claim 1 above, and further in view of Mayo (USPN 4,002,917).

10. With respect to claims 2 and 4, Shaw discloses the cylindrical anode (74) includes a central supporting cylinder, but does not specifically disclose a metallic layer at least a portion of which defines the target outer surface region. Mayo discloses an anode (4) with a central supporting portion and a metallic layer (tungsten -3) which defines the target outer surface region (column 2, lines 49-50). It would have been obvious to one of ordinary skill in the art at the time the invention was made that the

cylindrical anode of Shaw includes a metallic layer which defines the target outer surface region, because this would be necessary to emit X-rays.

11. With respect to claim 3, Shaw does not disclose the central supporting cylinder includes: an outer shell defining a hollow cylinder core; and at least one structural support member disposed in the hollow cylinder core, the at least one structural support member mechanically coupled to an associated rotating shaft. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the central supporting cylinder of Shaw be hollow, to make the rotating anode lighter in weight thereby making it easier to rotate. It would also have been obvious to then provide for at least one structural support member mechanically coupled to an associated rotating shaft, to enable rotation of the rotating anode.

12. Claims 5, 6, 13, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw, IV (USPN 4,039,836) as applied to claims 1, 17, and 18 above.

13. With respect to claim 5, Shaw does not specifically disclose the cylindrical anode (74) includes a substantially solid metallic cylinder, at least a portion of an outer surface of said solid metallic cylinder defining the target outer surface region of the cylindrical anode. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the cylindrical anode of Shaw is a substantially solid metallic cylinder, in order to enable the production of X-rays as the cylinder is rotated.

14. With respect to claim 6, Shaw does not disclose the cylindrical anode includes: a substantially hollow outer cylindrical shell; and at least one structural support member disposed in the substantially hollow outer cylindrical shell, the at least one structural support member mechanically coupled to an associated rotating shaft. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the cylindrical anode of Shaw include a substantially hollow outer cylindrical shell, to make the rotating anode lighter in weight thereby making it easier to rotate. It would also have been obvious to then provide for at least one structural support member mechanically coupled to an associated rotating shaft, to enable rotation of the rotating anode.

15. With respect to claims 13 and 20, Shaw does not disclose the sweep means includes a longitudinal reciprocating mechanism longitudinally reciprocating the cylindrical anode to effect a longitudinal reciprocating sweep of the at least one selected spot across the target outer surface region of the cylindrical anode. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to do this, as this is functionally equivalent to longitudinally sweeping the target spot across the target outer surface region of the cylindrical anode, as taught by Shaw. Both sweep means accomplish the same objective.

16. With respect to claim 19, Shaw does not specifically disclose fast-retracing the at least one electron beam to return to a longitudinal sweep starting point subsequent after each longitudinal sweep across the cylindrical anode. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to do this,

to prolong anode life by allowing a target spot to be cooled longer before emitting x-rays again.

17. Claims 1, 14, 15, 17, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mayo (USPN 4,002,917) in view of Shaw, IV (USPN 4,039,836) - hereinafter referenced "Shaw".

18. With respect to claims 1, 14, 17, and 24, Mayo discloses a CT scanner including: a rotating gantry (15) which rotates around an examination region (14) and an axis of revolution (16), an x-ray tube (17) being mounted to the rotating gantry with the axis parallel to the axis of revolution (column 5, lines 11-23); the x-ray tube including: an anode (4) having a target outer surface region (3); an electron accelerating means (2) for accelerating electrons (1) toward at least one selected spot on the target outer surface region of the anode to generate x-rays (6); and a sweep means (5) for relatively longitudinally sweeping the at least one selected spot across the target outer surface region of the anode; an x-ray detector (18) arranged to detect x-rays after the x-rays pass through the examination region; and a reconstruction processor (column 5, lines 3-4) for reconstructing output signals from the x-ray detector into an image representation.

Mayo discloses all of the elements except that the anode is a cylindrical rotating anode. Shaw discloses a cylindrical rotating anode (74). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the anode of Mayo to be a cylindrical rotating anode, to lengthen the life of the anode. By providing

for longitudinal scanning of a rotating anode, the anode is less susceptible to overheating, which would result in longer life of the anode.

19. With respect to claim 15, Mayo discloses a synchronization circuit that synchronizes the sweep with rotation of the rotating gantry (column 4, line 39 – column 5, line 2).

Allowable Subject Matter

20. Claims 8-12, 16, and 21-23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Prior art fails to disclose an x-ray tube that injects an x-ray conebeam into an examination region, the x-ray tube including a rotating cylindrical helical-slot collimator having a helical collimating slot formed therein, the collimator surrounding the rotating cylindrical anode and rotating about a collimator axis parallel to the cylinder axis, a helical pitch of the helical collimating slot and a rotation rate of the collimator being selected relative to the sweep of the at least one selected spot such that the at least one selected spot coincides with the helical-slot during the sweeping, as claimed in claim 8. Claims 9-12 are allowable due to their dependency on claim 8.

Prior art fails to disclose an x-ray tube that injects an x-ray conebeam into an examination region, the x-ray tube including a rotating cylindrical helical-slot collimator having a helical collimating slot formed therein, the collimator surrounding the rotating cylindrical anode and rotating about a collimator axis that is parallel to the cylinder axis,

a helical pitch of the helical collimating slot and a rotation rate of the collimator being selected relative to the sweep of the at least one selected spot such that the at least one selected spot coincides with the helical-slot during the sweeping, as claimed in claim 16.

Prior art fails to disclose a method of generating x-rays including rotating a helical-slot collimator around a collimator axis that is parallel to the cylinder axis, and sweeping the at least one selected spot in coordination with rotating the helical-slot collimator, as claimed in claim 21. Claims 22 and 23 are allowable due to their dependency on claim 21.

Conclusion

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jurie Yun whose telephone number is 571 272-2497. The examiner can normally be reached on Monday-Friday 8:30-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on 571 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jurie Yun
Examiner
Art Unit 2882

April 9, 2007